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RF

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/025,347

12/19/2001

Michiru Hokyoku

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24033

7590

10/23/2003

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EXAMINER

SOWARD, IDA M

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 10/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

RF

Office Action Summary

Application No.

10/025,347

Applicant(s)

HOGYOKU, MICHIRU

Examiner

Ida M Soward

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

This Office Action is in response to the Applicant's amendment filed September 8, 2003.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cabral, Jr. et al. (US 2002/0022366 A1) in view of Hu et al. (5,780,899) and Hirano (US 001/0029067 A1).

Cabral, Jr. et al. teach a semiconductor device comprising: a dielectric film (BURIED OXIDE) formed on a semiconductor substrate; a SOI film comprising single crystal Si formed on the dielectric layer film; a gate dielectric film formed on the SOI film; a gate electrode formed on the gate dielectric film; a diffusion layer for source/drain regions formed in source/drain regions of the SOI film; a thickness of the SOI film is 0.003 μm or greater and 0.1 μm or smaller which is in the ranges of 0.084 μm or greater and 0.094 μm or smaller; 0.089 μm or greater and 0.099 μm or smaller; 0.093 μm or greater and 0.103 μm or smaller; 0.096 μm or greater and 0.106 μm or smaller; 0.100 μm or greater and 0.110 μm or smaller; 0.068 μm or greater and 0.078 μm or smaller;

0.074 μm or greater and 0.084 μm or smaller; 0.078 μm or greater and 0.088 μm or smaller; 0.083 μm or greater and 0.093 μm or smaller; 0.087 μm or greater and 0.097 μm or smaller; 0.057 μm or greater and 0.067 μm or smaller; 0.063 μm or greater and 0.073 μm or smaller; 0.072 μm or greater and 0.082 μm or smaller; 0.076 μm or greater and 0.086 μm or smaller (Figure 4, pages 2 and 4, paragraphs [0024], [0060-0061] and [0066], respectively). However Cabral, Jr. et al. fail to teach a power supply voltage and an SOI impurity concentration. Hu et al. teach a power supply voltage of 0.6V (col. 6, claim 1). Hirano teaches an impurity concentration of an SOI film in the order of magnitude of $10^{17} / \text{cm}^3$ (Figure 15, page 4, paragraph [0063]). Hirano further teaches CMOS technology; first and second low concentration diffusion regions in contact with source/drain region, the first and second low concentration diffusion regions 7N & 7P having a lower impurity concentration than the source/drain regions, wherein a portion of each of the low concentration diffusion region extends under the gate electrode 6 (Figure 5, page 3, paragraph [0045]). In regard to the power supply voltage, Hu et al. discloses the claimed power supply voltage of 0.6V except for the power supply voltages of 0.8 and 1.0V. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the power supply voltage of Hu et al., since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In regard to the SOI film impurity concentration, Hirano discloses the SOI film impurity concentration of $10^{17} / \text{cm}^3$ except for the SOI film impurity concentration of claims 3-5, 8-10 and 13-15 which has an order of magnitude of $10^{18} / \text{cm}^3$. It would have

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been obvious to one having ordinary skill in the art at the time the invention was made to modify the SOI film impurity concentration of Hirano, since it has been held that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). See MPEP § 2144.05. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Cabral, Jr. et al. with the power supply voltage of Hu et al. and the SOI impurity concentration of Hirano to reduce contact resistance (page 5, paragraph [0065]).

Response to Arguments

Applicant's arguments filed 09-08-03 have been fully considered but they are not persuasive.

Since Cabral, Jr. et al., Hu et al. and Hirano from the same field of endeavor (SOI semiconductor devices), the purpose disclosed by Hirano (to provide a semiconductor device capable of suppressing delay in operation on page 2, paragraph [0026]), would have been recognized in the pertinent art of Cabral, Jr. et al. and Hu et al. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only

from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the motivation to do so is in Hirano (page 5, paragraph [0065]).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to further show the state of the art with respects to SOI structures:

Cherne (5,315,144)

Iwamatsu et al. (6,096,583)

Wu (6,060,749)

Yamaguchi et al. (US 6,358,783 B1).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ida M Soward whose telephone number is 703-305-3308. The Examiner can normally be reached on Monday - Thursday, 6:30 am to 5:00 pm.


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 703-308-4905. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ims

October 15, 2003



AMIR ZARABIAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800